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(71)Applicant : MATSUMOTO YUSHI SEIYAKU CO
LTD

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(72)Inventor : TAKAHARA ICHIRO
TANAKA KOSHI
KITANO KENICHI

(54) METHOD FOR PRODUCING WETTED HOLLOW FINE POWDER

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method for carrying out a scattering-preventing treatment enabling a large volume to be treated by a simpler method to provide the same quality, and further to provide a hollow plastic fine powder treated for preventing the scattering.

SOLUTION: This method for producing a wetted hollow plastic fine powder is characterized in that a powder mixer having ≥ 200 L volume and capable of being swung or stirred is used, and a liquid material is projected at ≤ 2 L/min rate from one projecting opening to ≥ 0.07 m² swinging surface of the hollow plastic fine powder while swinging or stirring the hollow plastic fine powder having 0.03-0.5 true specific gravity and 10-300 μ m average particle diameter to wet the plastic hollow fine powder.

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CLAIMS

[Claim(s)]

[Claim 1] The powder-mixing machine which can perform rocking or stirring which has the volume more than 200L is used, and they are true specific gravity 0.03-0.5. The manufacture approach of hollow plastics pulverized coal ***** characterized by being damp in discharge and hollow plastics pulverized coal, and carrying out the liquefied matter from one delivery by below 2L / part to two or more rocking 0.07m sides of hollow plastics pulverized coal, rocking or stirring hollow plastics pulverized coal with a mean particle diameter of 10-300 micrometers.

[Claim 2] The manufacture approach of hollow plastics pulverized coal ***** according to claim 1 that the liquefied matter breathed out is the viscosity of 500cps or less.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a lightweight hollow particle constituent.

[0002]

[Description of the Prior Art] As a bulking agent of a coating or plastics, hollow plastics pulverized coal is used in recent years, and is developed by each application. However, this hollow plastics pulverized coal was very a light weight (true specific gravity: 0.01-0.03), and was [the raising dust at the time of handling etc. is intense, and] difficult handling. For the reason, the hollow plastics pulverized coal by which sprayed the liquefied matter on the hollow plastics pulverized coal in a container with airless spray equipment, and scattering prevention processing was carried out is introduced like JP,2537428,B. However, even if it performs scattering prevention processing to lightweight hollow plastics pulverized coal (true specific gravity: 0.01-0.03), especially when blending this especially lightweight hollow plastics pulverized coal with paste-like objects, resin constituents, etc., such as a coating, in order to cause separation by the specific gravity difference for lightness of hollow plastics pulverized coal [itself] own [lightweight], a certain amount of viscosity is needed for that compound itself. In order to prevent this specific gravity difference separation, a certain coating is performed for the front face of especially lightweight hollow plastics pulverized coal, and since specific gravity is to some extent high in itself, what made that especially lightweight hollow plastics pulverized coal a certain amount of specific gravity (0.03-0.5) is effective to prevention of scattering or separation by raising dust and the specific gravity difference. The hollow plastics pulverized coal which performed coating to the front face of especially lightweight hollow plastics pulverized coal is introduced to JP,3-273037,A. Furthermore, if the liquefied matter is sprayed on the front face with airless spray equipment at the hollow plastics pulverized coal which performed coating and scattering prevention processing is performed, in addition to prevention of specific gravity difference separation, it is still much more effective to scattering or raising dust. If the presentation of the hollow plastics pulverized coal and the compound which performed coating when using bulking agents, such as the compound, etc. for the coating object on that occasion and using plasticizers, a diluent or solvents, such as the compound, etc. for the liquefied matter is adjusted, the same presentation as the time of using the hollow plastics pulverized coal which has performed no coatings will be acquired. If scattering prevention processing is performed to the hollow plastics pulverized coal which performed coating to the front face which is introduced to JP,3-273037,A with the equipment currently indicated by JP,2537428,B for the reason, in addition to prevention of specific gravity difference separation, it is still much more effective to scattering or raising dust.

[0003]

[Problem(s) to be Solved by the Invention] However, although the approach using the equipment or airless spray equipment currently introduced to JP,2537428,B is effective to be sure, as for the equipment currently introduced by that cause, 200L is considered to be a limitation for the throughput per time at most. This invention aims at offering the same mass scattering prevention processing construction approach which can be processed and the hollow plastics

pulverized coal by which scattering prevention processing was carried out by the simpler approach.

[0004]

[Means for Solving the Problem] The powder-mixing machine which can perform rocking or stirring which has the volume more than 200L is used for this invention, and it is true specific gravity 0.03-0.5. It is the manufacture approach of hollow plastics pulverized coal ***** characterized by being damp in discharge and hollow plastics pulverized coal, and carrying out the liquefied matter from one delivery by below 2L / part to two or more rocking 0.07m sides of hollow plastics pulverized coal, rocking or stirring hollow plastics pulverized coal with a mean particle diameter of 10-300 micrometers.

[0005] The hollow plastics pulverized coal which performed coating used for this invention is obtained by the approach to which the thermal-expansion nature minute ball was introduced in JP,3-273037,A as mentioned above. a series of product groups by which Kamiichi is specifically carried out as giant-molecule hollow minute ball composite filler:Matsumoto microsphere MFL series by Matsumoto Yushi-Seiyaku, Inc., or Pierce & a series of product groups by which Kamiichi is carried out as DUALITE series made from Stevens -- it can supply more. These are the hollow plastics pulverized coal by which coating was carried out with the calcium carbonate, the talc titanium dioxide, etc. in the front face with a true specific gravity [0.03 to 0.5], and a mean particle diameter of 10-300 micrometers.

[0006] Moreover, although the liquefied object used for being damp can be used for arbitration from water, an organic solvent, a plasticizer, silicone oil, a silicone oil emulsion, straight mineral oil, synthetic oil, a silane coupling agent, alcohols, prepolymer liquid, synthetic resins, etc., it is desirable that it is a liquefied object with a viscosity of 500cps or less. However, a liquefied object with which the liquefied object risks the shell polymer of the hollow plastics pulverized coal which is *****-ed, and destroys a hollow object is not desirable. The liquefied object which is not desirable specifically dissolves a shell polymer like the thing and DMF which risk shell polymers of hollow plastics pulverized coal, such as methanol ethanol, or DMAC.

[0007] The compounding ratio of hollow plastics pulverized coal and a liquefied object has the desirable compounding ratio in which should determine the compounding ratio with a liquefied object and the raising dust of the hollow plastics pulverized coal stops being specifically conspicuous in consideration of the raising dust condition by the front-face nature and the specific gravity of hollow plastics pulverized coal etc. Although a compounding ratio is shown to the following table with reference, if there is much liquefied amount of resources, the exudation of a liquefied object will increase extremely. For example, the exudation of a liquefied object increases extremely that it is more than the liquefied object 90 weight section to the hollow plastics pulverized coal 10 weight section of true specific gravity 0.03, and it is not desirable. On the other hand, if the liquefied amount of resources decreases, the raising dust of plastics pulverized coal is not conspicuous and desirable.

[0008]

中空プラスチック微 粉体：比重	0.03	0.05	0.1	0.2	0.3	0.4	0.5
中空プラスチック微 粉体：重量部	10	11	14	19	24	29	34
液状物（最大） ：重量部	90	89	86	81	76	71	66

[0009] What is necessary is just to use a common powder-mixing machine, although it is

necessary to rock or stir hollow plastics pulverized coal in order to carry out **ization. What is necessary is just to specifically use the powder-mixing machine which can perform rocking stirring or stirring of the ribbon mold mixer more than 200L **, a double compound rotor mold mixer, a perpendicular screw mold mixer, etc., etc. In recent years, stirring equipment is combined, various functions powder-mixing machine:super mixer (Kawata Mfg. Make) and high speed mixer (Made in the Fukae Factory) with sufficient reliance effectiveness, the new gram machine (Seishin Enterprise Make), etc. are introduced, and these may be used. Or very easy devices, such as a container and a stirring spring, are sufficient.

[0010] Although it sets to this invention, the hollow plastics pulverized coal of the specified quantity is supplied to the equipment (below equipment) which rocks or stirs hollow plastics pulverized coal and a liquefied object is added, it rocks or stirs until it is damp in homogeneity in hollow plastics pulverized coal and the liquefied matter is made from one delivery with this equipment after adding discharge and the liquefied matter in below 2L / part to 0.07m rocking or two or more stirring sides of hollow plastics pulverized coal at this time. A delivery is established on rocking or a stirring side or in inside. If a rocking or stirring side top or inside is moved as working, effectiveness of a delivery is very good, and although based also on the passing speed of working, compaction of the time amount taken for **izing by about 5 times as much discharge quantity as a fixed delivery to be possible, and for it to be damp and to be made to homogeneity after adding the liquefied matter to rocking or stirring at the passing speed of 20 cm/s is possible.

[0011] The reason for restricting the number of deliveries and the discharge quantity of the liquefied matter is based on the following reasons. If rocking or a stirring side is made or less [about 0.07m] into two per delivery, rocking of pulverized coal or movement of pulverized coal own [by stirring] falls for interference of the liquefied objects which came out from the delivery, and while a liquefied object has not fully contacted pulverized coal, it will be damp, and uniform **ization of the bank and the whole will become very difficult at the equipment lower part. Moreover, if the regurgitation of the liquefied matter is carried out 2L / above a part at this time, it will be damp, fully not contacting the pulverized coal rocked or stirred, and the whole uniform **ization will become very difficult also in the bank and this case at the equipment lower part. The end section of piping or a hose is only sufficient as this delivery. Moreover, shower-like opening and spray opening may be used. If it pressurizes to some extent and rod-like liquid is breathed out in order to carry out the regurgitation of the liquefied object with high viscosity, pulverized coal will seldom scatter around. the pulverized coal which will have been rocked or stirred if it changes into the condition that a pressure is made very high and sprayed — the surroundings — ***** — it becomes things, and it is damp and sealing-izing and the dust collector of equipment are needed.

[0012] The terminal judgment rocked or stirred until it is damp and is made to homogeneity, after adding a liquefied object to hollow plastics pulverized coal is damp, from two or more parts in equipment, it extracts a sample, measures true specific gravity with a liquid displacement method about each of those samples 0.5-0.8g, and should just judge, the variation, for example, the standard deviation etc., of the value etc.

[0013]

[Example] An example explains this invention concretely below.

**ization was carried out for the following hollow plastics fine particles with the following plasticizer using the ribbon blender (rocking [rotation 40rpm opening -] side: 1x2m-2m2) of example 11000L capacity.

- hollow plastics pulverized coal (Matsumoto Yushi-Seiyaku make: MFL-100SCA (true-specific-gravity =0.22, main particle diameter = 25 micrometers)): — **** 500L and 50kg - plasticizer (New Japan Chemical [Co., Ltd.] make: SANISO sizer DINP (viscosity of 55cps)): — 50kg (about 50L)

The time amount which 2L / part discharge, and plasticizer addition take from one delivery was about 25 minutes. although the whole seemed to carry out homogeneity distribution visually mostly at this time — damp — true-specific-gravity measurement (three places) =0.35 of an object, and 0. — it is 38 and 0.42 (standard deviation: 0.021), and it was judged that it was

inadequate. It stirred after plasticizer addition until it was damp and was made to homogeneity. the 15-minute back — damp — true-specific-gravity measurement (three places) =0.37 of an object, and 0. — it is 38 and 0.38 (standard deviation: 0.007), and was judged as the terminal point. it was obtained — it is damp, an object also has neither a pellet nor an insoluble-like object, and viewing is also almost uniform — it was damp, and it is an object and raising dust was not seen, either.

[0014] Two or more openings were prepared for addition of a plasticizer by the same formula as example 2 example 1, and **-ization was carried out. The time amount which opens sufficient spacing, prepares 20 deliveries and addition of 2L / part discharge, and a plasticizer takes from each (the rocking side which one delivery occupies: $2/20=0.1\text{m}^2$) delivery became 15 seconds per minute [about]. although the whole seemed to carry out homogeneity distribution visually — — damp — true-specific-gravity measurement (three places) =0.35 of an object, and 0. — it is 38 and 0.45 (standard deviation: 0.021), and it was judged that it was inadequate. It stirred until it was damp and was made to the homogeneity after plasticizer addition. the 5-minute back — damp — true-specific-gravity measurement (three places) =0.36 of an object, and 0. — it is 38 and 0.40 (standard deviation: 0.014), and it was judged that it was not a terminal point. further — the 5-minute back — damp — true-specific-gravity measurement (three places) =0.38 of an object, and 0. — it is 38 and 0.38 (standard deviation: 0.000), and was judged as the terminal point. it was obtained — it is damp, an object also has neither a pellet nor an insoluble-like object, and viewing is also almost uniform — it was damp, the object is done and raising dust was not seen, either.

[0015] The time amount which 5L / part discharge, and plasticizer addition take from one delivery by the same formula as example of comparison 1 example 1 was about 10 minutes. It stirred until it was damp and was made to the homogeneity after plasticizer addition. the 15-minute back — damp — true-specific-gravity measurement (three places) =0.34 of an object, and 0. — it is 38 and 0.52 (standard deviation: 0.028), and it was judged that it was not a terminal point. further — the 15-minute back — damp — true-specific-gravity measurement (three places) =0.34 of an object, and 0. — it is 38 and 0.42 (standard deviation: 0.028), and it was judged that it was not a terminal point. further — the 15-minute back — damp — true-specific-gravity measurement (three places) =0.37 of an object, and 0. — it is 38 and 0.40 (standard deviation: 0.007), and was judged as the terminal point for the time being. It was obtained, and it was damp, as for the object, the pellet and the insoluble-like object were seen visually, and raising dust was not seen. The lower part of a ribbon blender was dirty in the shape of a paste with the plasticizer.

[0016] **-ization was carried out having put [the following hollow plastics fine particles put into the plastic bag of example of comparison 2200L capacity] in the gun for the following plasticizer into fine particles by human power with the airless spray atomiser, and rocking fine particles. — hollow plastics pulverized coal (Matsumoto Yushi-Seiyaku make: MFL-100SCA (true-specific-gravity =0.22, main particle diameter = 25 micrometers)): — **** 50L and 5kg — plasticizer (New Japan Chemical [Co., Ltd.] make: SANSO sizer DINP (viscosity of 55cps)): — 5kg (about 5L) The time amount which plasticizer addition takes was about 15 minutes. true-specific-gravity measurement (three places) =0.34 at this time, and 0. — it was 39 and 0.52 (standard deviation: 0.035), and it was damp and it was judged that a condition was imperfect. Moreover, although the plastic bag of this 200L capacity was made to rock, or the hand mixer was put into the bag and it stirred since the part into which it has got wet a pellet and in the shape of a paste for the time being also viewing although raising dust is controlled was conspicuous, the insoluble-like object was not canceled after all.

[0017]

[Effect of the Invention] The same mass scattering prevention processing construction approach which can be processed and the hollow plastics pulverized coal by which scattering prevention processing was carried out can be offered by the simpler approach by the approach using the equipment or airless spray equipment currently introduced to the hollow plastics pulverized coal which performed coating to the front face by this invention at JP,2537428,B ****.

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(21)出願番号	特願平11-376141		(71)出願人	000188951 松本油脂製菓株式会社 大阪府八尾市渡川町2丁目1番3号
(22)出願日	平成11年11月29日(1999. 11. 29)		(72)発明者	高原 一郎 大阪府八尾市渡川町2丁目1番3号 松本 油脂製菓株式会社内
			(72)発明者	田中 耕嗣 大阪府八尾市渡川町2丁目1番3号 松本 油脂製菓株式会社内
			(72)発明者	北野 健一 大阪府八尾市渡川町2丁目1番3号 松本 油脂製菓株式会社内
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(54)【発明の名称】 湿化中空微小粉体の製造方法

(57)【要約】

【課題】 本発明は、より簡易な方法にて大容量の処理が可能な同様の飛散防止処理施工方法および飛散防止処理された中空プラスチック微粉体を提供することを目的とする。

【構成】 本発明は、200L以上の容積を有する揺動または攪拌を行える粉体混合機を用い、真比重0.03～0.5 平均粒子径10～300 μ mの中空プラスチック微粉体を揺動または攪拌しつつ、中空プラスチック微粉体の揺動面0.07m²以上に対して、1つの吐出口より液状物質を2L/分以下で吐出し、中空プラスチック微粉体を湿化することを特徴とする、中空プラスチック微粉体湿化物の製造方法である。

【特許請求の範囲】

【請求項 1】 200 L 以上の容積を有する揺動または攪拌を行える粉体混合機を用い、真比重 0.03~0.5 平均粒子径 10~300 μm の中空プラスチック微粉体を揺動または攪拌しつつ、中空プラスチック微粉体の揺動面 0.07 m^2 以上に対して、1つの吐出口より液状物質を 2 L/分以下で吐出し、中空プラスチック微粉体を湿化することを特徴とする、中空プラスチック微粉体湿化物の製造方法。

【請求項 2】 吐出される液状物質が粘度 500 c p s 以下である、請求項 1 記載の中空プラスチック微粉体湿化物の製造方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は軽量な中空微粒子組成物に関する。

【0002】

【従来の技術】 塗料やプラスチックの充填剤として中空プラスチック微粉体が近年用いられ、各用途に展開されている。しかし、この中空プラスチック微粉体は非常に軽量（真比重：0.01~0.03）であり、取扱い時の発塵等が激しく取扱いが困難であった。その為、特許 2537428 号の様に、容器中の中空プラスチック微粉体にエアレススプレー装置により液状物質を噴霧し飛散防止処理された中空プラスチック微粉体が紹介されている。しかし、特に軽量な中空プラスチック微粉体（真比重：0.01~0.03）に飛散防止処理を施しても、塗料等のペースト状物や樹脂組成物等にこの特に軽量な中空プラスチック微粉体を配合する場合は、軽量な中空プラスチック微粉体そのものの自身の軽さのために比重差による分離を起こすために、その配合物自体にある程度の粘度が必要となってくる。この比重差分離を防止するためには、特に軽量な中空プラスチック微粉体の表面を何らかのコーティングを施し、その特に軽量な中空プラスチック微粉体にある程度の比重（0.03~0.5）にしたものはそれ自体比重がある程度高い為に飛散や発塵また比重差による分離の防止に対して有効である。その特に軽量な中空プラスチック微粉体の表面にコーティングを施した中空プラスチック微粉体は特開平 3-273037 に紹介されている。更に、その表面にコーティングを施した中空プラスチック微粉体にエアレススプレー装置により液状物質を噴霧し飛散防止処理を施せば、比重差分離の防止に加えて、飛散や発塵に対してなお一層有効である。その際にコーティング物にその配合物等の充填剤等を用い、また液状物質にその配合物等の可塑剤や希釈剤または溶剤等を用いれば、コーティングを施した中空プラスチック微粉体と配合物の組成を調整すれば、なにもコーティングを施していない中空プラスチック微粉体を用いた時と同様の組成が得られる。その為、特許 2537428 号に開示されている装置にて

特開平 3-273037 に紹介されている表面にコーティングを施した中空プラスチック微粉体に飛散防止処理を施せば、比重差分離の防止に加えて飛散や発塵に対してなお一層有効である。

【0003】

【発明が解決しようとする課題】 しかるに、特許 2537428 号に紹介されている装置もしくはエアレススプレー装置を用いる方法は確かに有効であるが、それにより紹介されている装置は 1 回当たりの処理量がせいぜい 200 L が限界と考えられる。本発明は、より簡易な方法にて大容量の処理が可能な同様の飛散防止処理施工方法および飛散防止処理された中空プラスチック微粉体を提供することを目的とする。

【0004】

【課題を解決するための手段】 本発明は、200 L 以上の容積を有する揺動または攪拌を行える粉体混合機を用い、真比重 0.03~0.5 平均粒子径 10~300 μm の中空プラスチック微粉体を揺動または攪拌しつつ、中空プラスチック微粉体の揺動面 0.07 m^2 以上に対して、1つの吐出口より液状物質を 2 L/分以下で吐出し、中空プラスチック微粉体を湿化することを特徴とする、中空プラスチック微粉体湿化物の製造方法である。

【0005】 本発明に用いるコーティングを施した中空プラスチック微粉体は、前述のように熱膨張性微小球を特開平 3-273037 にて紹介された方法等で得られる。具体的には松本油脂製菓株式会社製の高分子中空微小球コンボジットフィラー：マツモトマイクロスフェア MF L シリーズとして上市されている一連の製品群、または Pierce & Stevens 社製 DUALITE シリーズとして上市されている一連の製品群、より調達することができる。これらは真比重 0.03~0.5、平均粒子径 10~300 μm の表面を炭酸カルシウムやタルク二酸化チタン等でコーティングされた中空プラスチック微粉体である。

【0006】 また湿化に用いる液状物は、水、有機溶媒、可塑剤、シリコンオイル、シリコンオイルエマルジョン、鉱物油、合成油、シランカップリング剤、アルコール類、プレポリマー液、合成樹脂類等から任意に用いることができるが、粘度 500 c p s 以下の液状物であることが望ましい。しかし、その液状物が被湿化物である中空プラスチック微粉体のシェルポリマーを冒し中空体を破壊する様な液状物は好ましくない。好ましくない液状物は、具体的にはメタノール・エタノール等中空プラスチック微粉体のシェルポリマーを冒すもの、DMF や DMAC のようにシェルポリマーを溶解するものである。

【0007】 中空プラスチック微粉体と液状物の配合比は、中空プラスチック微粉体の表面性や比重による発塵具合等を考慮して液状物との配合比は決定するべきであ

り、具体的にはその中空プラスチック微粉体の発塵が目立たなくなる配合比が望ましい。下記表に配合比を参考として提示するが、液状物量が多いと、液状物のしみ出しが極めて多くなる。例えば、真比重0.03の中空プラスチック微粉体10重量部に対して液状物90重量部以*

*上であると、液状物のしみ出しが極めて多くなり好ましくない。一方、液状物量が少なくなると中空プラスチック微粉体の発塵が目立ち好ましくない。

【0008】

中空プラスチック微粉体：比重	0.03	0.05	0.1	0.2	0.3	0.4	0.5
中空プラスチック微粉体：重量部	10	11	14	19	24	29	34
液状物（最大）：重量部	90	89	86	81	76	71	66

【0009】湿化を実施するためには中空プラスチック微粉体を揺動または攪拌する必要があるが、一般的な粉体混合機を用いればよい。具体的には、200L容以上のリボン型混合機や複軸ローター型混合機、垂直スクリー型混合機等の揺動攪拌または攪拌を行える粉体混合機を用いればよい。近年、攪拌装置を組み合わせたより効率のよい多機能な粉体混合機：スーパーミキサー（株式会社カワタ製）やハイスピードミキサー（株式会社深江製作所製）、ニューグラムマシン（株式会社セイシン企業製）等も紹介されており、これらを用いても良い。または容器と攪拌パネといった極めて簡単な機構でも良い。

【0010】本発明においては、中空プラスチック微粉体を揺動または攪拌する装置（以下湿化装置）に所定量の中空プラスチック微粉体を投入し、液状物を添加するが、この時に中空プラスチック微粉体の揺動または攪拌面0.07m²以上に対して、1つの吐出口より液状物質を2L/分以下で吐出し、液状物質を添加後この装置で中空プラスチック微粉体を均一に湿化できるまで揺動または攪拌する。吐出口は揺動または攪拌面上または内に設ける。吐出口は可動式として揺動または攪拌面上または内を動くようにすれば非常に効率がよく、可動式の移動速度にもよるが、20cm/sの移動速度では固定式の吐出口の約5倍の吐出量での湿化が可能であり、液状物質を添加後に均一に湿化できるまで揺動または攪拌に要する時間の短縮が可能である。

【0011】吐出口の数および液状物質の吐出量を制限する理由は以下のような理由による。1つの吐出口あたり揺動または攪拌面を約0.07m²以下とすると、吐出口より出た液状物同士の干渉の為に微粉体の揺動または攪拌による微粉体自身の運動が低下し、液状物が微粉体に十分に接触しないまま湿化装置下部にたまり、全体の均一湿化が極めて困難となる。また、この時に液状物

質を2L/分以上で吐出すると、揺動または攪拌している微粉体に十分に接触しないまま湿化装置下部にたまり、この場合も全体の均一湿化が極めて困難となる。この吐出口は単に配管やホースのエンド部でも良い。またシャワー状の口やスプレー口を用いても良い。粘度の高い液状物を吐出するためある程度加圧して、棒状の液を吐出してやれば微粉体があまり廻りに飛び散らない。圧力を極めて高くして噴霧するような状態にしてやると、揺動または攪拌している微粉体を廻りに巻散らすこととなり、湿化装置の密閉化や集塵装置が必要となる。

【0012】中空プラスチック微粉体に液状物を添加した後、均一に湿化できるまで揺動または攪拌する、終点の判定は、湿化装置内の複数の部分より試料を採取し、その各試料0.5～0.8gについて液体置換法にて真比重を測定し、その値のバラツキ例えば標準偏差等で判定を行えばよい。

【0013】

【実施例】以下実施例にて本発明を具体的に説明する。

実施例1

1000L容量のリボンブレンダー（回転40rpm 開口部～揺動面：1×2m～2m²）を用いて下記中空プラスチック粉体を下記可塑剤にて湿化を実施した。

・中空プラスチック微粉体（松本油脂製薬（株）製：MFL-100SCA（真比重＝0.22、中心粒子径＝25μm））：50kg～嵩約500L

・可塑剤（新日本理化（株）製：サンソサイザーDINP（粘度55cps））：50kg（約50L）

1つの吐出口より2L/分吐出し、可塑剤添加に要する時間は約25分であった。この時ほぼ全体は均一分散されているように目視では見えたが、湿化物の真比重測定（3カ所）＝0.35、0.38、0.42（標準偏差：0.021）であり不十分であると判断した。可塑

剤添加後、均一に湿化できるまで攪拌をおこなった。15分後の湿化物の真比重測定（3カ所）＝0.37, 0.38, 0.38（標準偏差：0.007）であり終点と判断した。得られた湿化物は、ダマやママコ状物もなく目視でもほぼ均一な湿化物であり、発塵も見られなかった。

【0014】実施例2

実施例1と同様の処方にて可塑剤の添加を複数の口を設けて湿化を実施した。20個の吐出口を十分な間隔を開けて設けて（1つの吐出口の占める揺動面： $2 \div 20 = 0.1 \text{ m}^2$ ）各吐出口より2L/分吐出し、可塑剤の添加に要する時間は約1分15秒となった。全体は均一分散されているように目視では見えたが、湿化物の真比重測定（3カ所）＝0.35, 0.38, 0.45（標準偏差：0.021）であり不十分であると判断した。可塑剤添加後均一に湿化できるまで攪拌をおこなった。5分後の湿化物の真比重測定（3カ所）＝0.36, 0.38, 0.40（標準偏差：0.014）であり終点ではないと判断した。更に5分後の湿化物の真比重測定（3カ所）＝0.38, 0.38, 0.38（標準偏差：0.000）であり終点と判断した。得られた湿化物は、ダマやママコ状物もなく目視でもほぼ均一な湿化物が出来上がっており、発塵も見られなかった。

【0015】比較例1

実施例1と同様の処方にて1つの吐出口より5L/分吐出し、可塑剤添加に要する時間は約10分であった。可塑剤添加後均一に湿化できるまで攪拌をおこなった。15分後の湿化物の真比重測定（3カ所）＝0.34, 0.38, 0.52（標準偏差：0.028）であり終点ではないと判断した。更に15分後の湿化物の真比重測定（3カ所）＝0.34, 0.38, 0.42（標準偏差：0.028）であり終点ではないと判断した。更*

＊に15分後の湿化物の真比重測定（3カ所）＝0.37, 0.38, 0.40（標準偏差：0.007）でありとりあえず終点と判断した。得られた湿化物は、ダマやママコ状物が目視で見られ、発塵は見られなかった。リボンブレンダーの下部が可塑剤によってペースト状に汚れていた。

【0016】比較例2

200L容量のポリ袋に入れた下記中空プラスチック粉体を、下記可塑剤をエアレスブレイ噴霧装置にて人力でガンを粉体中に入れ粉体を揺動しつつ湿化を実施した。

・中空プラスチック微粉体（松本油脂製菓（株）製：MFL-100SCA（真比重＝0.22、中心粒子径＝ $25 \mu\text{m}$ ））：5kg～嵩約50L

・可塑剤（新日本理化学（株）製：サンソサイザーDINP（粘度55cps））：5kg（約5L）

可塑剤添加に要する時間は約15分であった。この時の真比重測定（3カ所）＝0.34, 0.39, 0.52（標準偏差：0.035）であり湿化状態は不完全と判断した。また、目視でもとりあえず発塵は抑制されているが、ダマやペースト状に濡れている部分が目立っていたので、この200L容量のポリ袋を揺動させたり、ハンドミキサーを袋にいれて攪拌したが、結局ママコ状物は解消されなかった。

【0017】

【発明の効果】本発明によって、表面にコーティングを施した中空プラスチック微粉体に特許2537428号公号に紹介されている装置もしくはエアレスブレイ装置を用いる方法により、より簡易な方法にて大容量の処理が可能な同様の飛散防止処理施工方法および飛散防止処理された中空プラスチック微粉体を提供することができる。

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